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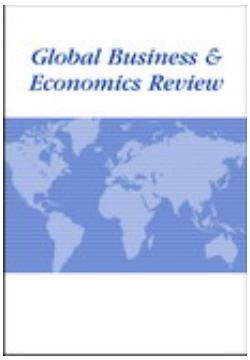

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Financial performance and corporate risk disclosure: the moderating impact of board structure

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Financial performance and corporate risk disclosure: the moderating impact of board structure

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Abstract: The study aims to unravel the moderating impact of board attributes, i.e., board size, board independence and gender diversity on the relationship between firms' financial performance and corporate risk disclosure in the annual reports of Indian listed non-financial firms. For achieving the objective, the study deploys hierarchical moderated regression on a sample of S&P BSE-100 index pertaining to financial year 2018–2019. In addition, automated content analysis has been employed to operationalise the dependent variable, i.e., risk disclosure. The main findings unveil that board size and board independence positively moderate the relationship between firm performance and risk disclosure; suggesting that larger the board size and higher the proportion of independent directors; higher the performance impacts risk disclosure. Contrarily, proportion of women directors negatively moderates the relationship between firm performance and risk disclosure emphasising on the importance of women directors in disclosing risk in low profitable firms.

Keywords: board size; gender diversity; board structure; profitability; risk disclosure.

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1 Introduction

The excerpt "there can be no great accomplishment without risk" by Neil Armstrong seems to be the essence of every firm in the contemporary age. All whooping gains are not cost free as can be evidenced in the subprime crisis which had impacted the economies world over. The research in the domain of risk disclosure by the corporations gained momentum post the biggest melt down and accounting frauds such as Enron, WorldCom, and Lehman Brothers (Rajab and Handley, 2009; Ali and Taylor, 2014). Another thrust to the topic of risk disclosure will be attributed to the onset of COVID-19 pandemic which has caused turbulent social economic disruption including largest economic recession globally (https://en.wikipedia.org/wiki/COVID-19_pandemic). Risk disclosure is a pre-dominant issue in corporate communication (Beretta and Bozzolan, 2004) which warns allied stakeholders of future uncertainty due to globalisation. It intends transparency by narrowing down information asymmetry through divulgence of risk information which expedites prudent decision making.

Amidst the prevailing uncertainty, prior efforts of the researchers have been in establishing a direct linkage between different firm level attributes and divulgence of risk information such as firm size (Beretta and Bozzolan, 2004; Linsley and Shrives, 2006; Abraham and Cox, 2007; Konishi and Ali, 2007; Amran et al., 2008; Oliveira et al., 2011; Ntim et al., 2013; Miihkinen, 2012; Elshandidy et al., 2013; Elshandidy et al., 2014; Elshandidy and Neri, 2015; Ismail and Arshad, 2016; Marzouk, 2016; Tauringana and Chithambo, 2016); industry (Amran et al., 2008; Hassan, 2009; Rajab and Handley, 2009; Oliveira et al., 2011; Elzahar and Hussainey, 2012). Correspondingly, firm profitability which symbolises the performance of a firm, being a major attribute lacks concordance in the findings with respect of risk disclosure. Most studies have failed to find any association between firm profitability and risk disclosure (Mohobbot, 2005; Konishi and Ali, 2007; Elshandidy et al., 2013; Martikainen et al., 2015; Marzouk, 2016; Tauringana and Chithambo, 2016; Agyei-Mensah, 2017) whereas, researchers like Elshandidy and Neri (2015) and Allini et al. (2016) found a negative relationship between the two. Prior research neglected to direct future researchers to probe into reasons for incongruity in the findings of firm profitability and risk disclosure which restrained our knowledge on such a pivotal arena.

Taking viewpoint of risk advocates, contemporary research unveils that there have been growing interest in corporate governance structures and risk disclosure in the global context (Ntim et al., 2013; Said and Mellet, 2013; Elshandidy et al., 2013; Dominguez and Gamez, 2014; Elshandidy and Neri, 2015; Agyei-Mensah, 2017). Fama and Jensen (1983) and Jensen (1993) theorise that corporate governance mechanisms that are well implemented could benefit shareholders financially by exercising more control on the management of the company. Extending the belief amongst the diverse board related attributes, those identified for their significant impact on risk disclosure have been chosen such as board size, as larger boards brings in enhancement in quality of decision

including risk disclosure (Dominguez and Gamez, 2014); board independence (Abraham and Cox, 2007; Oliveira et al., 2011; Ntim et al., 2013; Elshandidy et al., 2013; Agyei-Mensah, 2017) facilitate effective monitoring through limiting opportunism in the management (Fama and Jensen (1983) and gender diversity (Ntim et al., 2013; Allini et al., 2016) augments fresh perspective and effective monitoring.

Theoretical underpinning behind divulging risk information lies in the agency theory framework which promulgates that principal-agent problem emanates when manager (agent) is able to take decision on behalf of principal (shareholders). The divergence of interest leads to information asymmetry. Linsley and Shrives (2000) states that agency theory holds the explanation why managers decide to divulge risk information for mitigating agency conflict. Further, considering the susceptibility of profitable firms to higher managerial manipulation; agency theory underscores the establishment of an effective board structure which augments various corporate decisions; one of them being decision on risk disclosures. In addition, since the entire gain from profit enhancing activities cannot accrue to managers due to the apportionment of ownership among external investors, their urge to enhance their control over firms' resources multiply. Accordingly, they are inclined to indulge in entrenchment activities that sometimes may not be in the best interest of shareholders. Therefore, robust board structure needs to be established for strengthening various corporate outcomes, one of them being, risk disclosure, in turn, safeguarding the interest of investors. The role of voluntary disclosures, notably, risk disclosure in curbing various agency issues is widely acknowledged in various prior studies (Saggar and Singh, 2017). Hence, drawing support from agency framework which promulgates the establishment of board structure as an internal control mechanism to address agency conflicts; it is argued that presence of sturdy board characteristics like board size, board independence and gender diversity in profitable firms would be instrumental in ensuring transparency and information symmetry via adequate risk disclosures. Conversely, proprietary cost theory underpins that a firm's decision to divulge its exclusive information publicly can damage its competitive position in the product market (Verrecchia, 1983). There is always a threat that competitors might exploit risk information which might cost hefty to a firm. The theory of proprietary cost emphasises on the potential harm that can emanate from the publicly accessible information that is open for the public as well as the competitors. Gray et al. (1990) brings out the various disadvantages from disclosure of firm specific information such as threat of takeovers or mergers; possibilities of intervention from the government agencies and taxation authorities; claims by employees or trade union or from political and consumer groups, thereby resulting into aggravating pressure from diverse groups in the form of demand related to prices or salaries (Dominguez and Gamez, 2014). Amidst these problems, board act as a conciliator that rationalises the cost-benefit of disclosure and monitors the quality and quantity of disclosure. These theoretical aspects draws the attention towards the importance of board characteristics in modifying the underlying relationship between two attributes, herein, firm performance and risk disclosure; propelling the study towards investigating the moderating role, if any, of board characteristics on the relationship between main variables.

The motivation of present study is threefold: firstly, the subject of risk has always been a matter of discussion for the regulators and accounting community as witnessed through adoption of accounting standards such as GAS-5 in Germany (Elshandidy et al., 2014); IFRS 7: financial instruments disclosure in UAE; Portugal; Spain, Malaysia, India

(Oliveira et al., 2011; Dominguez and Gamez, 2014; Amran et al., 2008); FRR No 48 in United States (Elshandidy et al., 2014) and other guidelines on risk disclosure such as Combined code of best practice in the UK, Kings II report in South Africa (Ntim et al., 2013). Besides regulatory pressures, the divulgence of risk information varies across the globe which makes it more challenging for the policy makers and investors to arrive at common conclusion about risk disclosure practices globally. Secondly, India's position as an emerging economy validates prime attention being a country practicing common law (Laporta et al., 1998). Moreover, lack of stringent law enforcement in the country necessitates the role of internal governance structure (Ganguli and Deb, 2021). Shivaani and Agarwal (2020) put forth that Indian regulatory environment provides unique natural setup where risk disclosure is stretched between mandatory and voluntary adoption of regulation thus making it crucial to study risk disclosure amidst the existing discretion of managers. Secondly: reconfirming a relationship on one of the dominant attribute of a firm, i.e., firm performance and risk disclosure in the presence of intervening variable such as board structure is an untapped area in this domain which triggers our research.

Given this background, the study strives to achieve as follows: firstly, it immensely contributes towards expanding the dimensions of prominent agency theory of corporate governance by extending it to explain the moderating role of board characteristics. Secondly, the studies making empirical association between firm performance and risk disclosure which has largely been prescriptive; whereby the prior research have only established direct and apparent linkage between variables; making the present study novel as it has attempted to plug-in loose ends by examining tripartite relationship between profitability, board characteristics and risk disclosure. Further, it has triggered the debate on the issue that examining only direct impact between two variables, herein, firm performance and risk disclosure may not suffice the purpose as the third variable, i.e., board structure may interfere and modify the inherent relationship. Like, the present study finds that firm profitability reduces the disclosure of risk information due to high proprietary cost incurred with each bit of risk disclosure. However, with the intervention of board size and board independence, the relationship changes as larger board size and higher proportion of independent directors induces the profitable firms to comprehensively disclose risk information so that information asymmetry is narrowed, transparency is improved and investors' confidence is reinforced. Quite the contrary, gender diversity strengthens the underlying negative relationship suggesting that in order to signal firms' transparency and curtailed uncertainty among investors'; they compel financially impoverished firms to undertake broader disclosure of risk. Due to these altered relationships, the scholarly community no longer embraces the work that evidently ignores the gravity of intervening factors; making the present study an instrumental study in enlarging the dimensions of risk disclosure literature. Besides, to the authors' best knowledge, no study till date has analysed the moderating impact of board size, board independence and gender diversity on the relationship between firm profitability and risk disclosure.

This study is ordered into five sections. After introduction, the second section discusses the prior literature and hypothesis development on firm performance and risk disclosure by moderating the effect of board structure in the Indian context. Section 3 discusses research methodology adopted in the current study. Section 4 decrypts the results of hierarchical regression along with descriptive statistics and correlation matrix. Finally, the last section set forth the conclusion and implications of the findings.

2 Literature review and hypothesis development

2.1 Impact of firm's profitability on risk disclosure

The resurgence of interest in corporate financial performance captured through firm profitability is accredited to the fact that prior research lacks unison in establishing its relationship with divulgence of risk information. Strand of prior literature (Mohobbot, 2005; Konishi and Ali, 2007; Vandemaele et al., 2009) on firm profitability and risk disclosure were executed in different countries having novel institutional settings; diverse risk disclosure policies and therefore, scrutinising the relationship in isolation without contemplating the presence of moderator variable is not justifiable to arrive at a conclusion.

2.1.1 Relationship between financial performance and risk disclosure

Theoretical perspective by signalling theory underpins that profitable firms have greater impetus to divulge information as it reduces the risk of sceptical viewpoint by the markets and analogously assists in obtaining funds at low cost. The companies which are vigilant and more responsive in managing risk want to signal their proficiency to the market place through higher divulgence of risk. Further, a study undertaken by Konishi and Ali (2007) enlarges the horizon by relating risk disclosure with transparency for quenching stakeholders need. Contrarily, a negative relationship between firm profitability and risk disclosure has its genesis in the proprietary cost which profitable companies have to incur adding with every piece of information kept in the public domain (Oliveira et al., 2011). Amidst the discussed dual frame of reference, empirical literature document insignificant relationship between firm's profitability and risk disclosure (Mohobbot, 2005; Elshandidy et al., 2013; Dominguez and Gamez, 2014; Madrigal et al., 2015; Atanasovski et al., 2015; Elshandidy and Neri, 2015). On the other hand, Mohobbot (2005) documented negative relationship between firm profitability and risk disclosure.

Aforementioned discussion explicitly suggests that investigating the relationship between financial performance and risk disclosure is debatable issue with the findings ranging from attaching the significant positive impact to negative impact and further to non-significant impact on risk disclosure. However, largely based on proprietary cost theory; profitable firms' fear of the competitors' capitalising their publicly available private information like business plans and policies for their own strategic decisions and growth deter them from engaging intensive corporate disclosure, notably, risk disclosure. Hence, the idea to prevent the potential competitors from leveraging their proprietary information, propels them to indulge in meagre risk disclosure (Gelb, 2000; Luo et al., 2006). In other words, apprehensions about erosion of their market share (proprietary cost) due to easy accessibility of classified information in public sphere reduces executives' tendency to divulge risk related information in annual reports. Accordingly, supporting the proprietary cost view point, it is hypothesised that:

H1 Financial performance negatively influences corporate risk disclosure.

2.2 Moderating role of board structure

The literature has been replete with abundance of studies examining the association between board structure and risk disclosure. The essence of board structure lies in its capacity to augment the firm value; which inter-alia, depends upon the firm profitability (Donker and Zahir, 2008). As theoretical underpinnings and extant literature asserts that effective board structure facilitates corporate disclosure; it can impact the extent of divulgation of risks by firms (Gul and Leung, 2004). However, the literature has so far only predicted its direct association with various voluntary and mandatory disclosures, particularly, corporate risk disclosure. Its prominence as intervening variables on the relationship between various corporate attributes and organisational outcomes is still at its incipient stage which stimulates the present study towards assaying its indirect impact on the existing dynamics between firm profitability and risk disclosure. Besides, the contradictory and inconclusive findings pertaining to empirical relationship between profitability and corporate risk disclosure has led the researchers to ponder that these equivocal and ambivalent findings may be due to the intercession by other variables on their direct association. Since, the empirical literature is unanimous on the association between board characteristics and corporate risk disclosure, it is plausibly envisaged that they may have an intervening impact on the relationship between profitability and risk disclosure. Against this backdrop, the current paper attempts to initiate the discussion on the importance of various components of board structure like board size, board independence, gender diversity in moderating the relationship between profitability and risk disclosures.

2.2.1 Relationship between financial performance, board size and risk disclosure

Board size is discerned as a prime element of the board which leads to its effectiveness. Large boards are privileged with greater knowledge and expertise (Luo, 2005).The theoretical viewpoint by agency theory postulates that larger boards possess better monitoring skills (Elshandidy and Neri, 2015) which in turn attenuates information asymmetry and improves the quality of information disclosure (Karamanou and Vafeas, 2005). Reinforcing the prior viewpoint, Verrecchia (2001) puts forth that greater disclosure will alleviate the need to probe into private information. Large boards are affiliated with greater diversity in terms of expertise (Branco and Rodrigues, 2006) contrarily, smaller boards are attributed to low expertise, high agency costs resulting into CEO dominance which in turns impedes the board's ability towards strong corporate governance responsibilities (Bassett et al., 2007).

Considered as the good governance practice, optimum size of board of directors assists the firms with effective monitoring, newer perspectives in solving various strategic problems and enhancing their decision making on various corporate disclosures (Pearce and Zahra, 1992; Dalton et al., 1999). In other words, larger board of directors implies superior effectiveness in making various disclosures, notably, risk disclosures. Hence, in order to maintain their profitability position, reduce information asymmetry, managerial misconduct and ensure higher transparency in financial market; board of directors in profitable firms have tendency to divulge the information about various sorts of risks to which company is exposed to. Additionally, since profitable firms can afford incurring higher competitive cost, board ensures larger corporate risk disclosures for

bolstering its standing in the market. Further, the vulnerability of profitable firms to higher managerial entrenchment, in turn, higher agency cost, stimulates the corporate houses to indulge in unveiling higher risk related information. Hence, in order to uproot agency evils from the organisation, agency theory promulgates the establishment of effective internal control system through larger board size (Pearce and Zahra, 1992). Additionally, since large-sized board is believed to foster monitoring abilities of firm, they reach to an agreement of disclosing risk related information only after various sessions of thorough negotiations and discussions (Kao et al., 2018; Orazalin, 2019). Strongly, based on agency rationale, it is hypothesised that

H2 Board size positively moderates the relationship between firm profitability and risk disclosure.

2.2.2 Relationship between financial performance, board independence and risk disclosure

Theoretical underpinning put forth by agency theory is that independent directors are likely to lessen agency conflicts between managers and shareholders as these outside directors will not have any kind of linkage with insiders (managers) and outsiders (shareholders) hence, will provide unprejudiced opinions that will be beneficial for the company (Patelli and Prencipe, 2007). Independent non-executive directors examine the activities of executive directors in an indirect manner (Donnelly and Mulcahy, 2008). They possess the impetus to demand information since their personal reputation is at stake (Lopes and Rodrigues, 2007). In consonance with the rationale described, prior risk disclosure studies documented positive relationship with risk disclosure such as Oliveira et al. (2011) and Abraham and Cox (2007). Contrarily, independent directors on board refrain from disclosing more information about corporate risks, due to their insufficient knowledge in firm business activities and divided attention to its internal operations with their simultaneous attention on other boards. Further, they are less inclined to impart voluntary information that may evoke legal actions against firm; insinuating the negative relationship with corporate risk disclosure (Lorenzo and Sanchez, 2009). Refuting both these divergent scholarly opinions, studies documented insignificant relationship between the two (Elshandidy and Neri, 2015; Allini et al., 2016; Madrigal et al., 2015; Saggar and Singh, 2017).

Although, the fear of legal penalty forbids independent directors from substantially divulging risk information, the situation is somewhat different in case of profitable firms. Being highly vulnerable to managerial entrenchment and malfeasance, higher proportion of independent directors in such firms exercise effective monitoring and control to limit managerial opportunism through significant disclosure of risk information (Eng and Mak, 2003). Further, in order to prevent erosion of their reputational capital and safeguard investors' interest, board comprising of outside directors fosters the corporate risk disclosure, particularly, in profitable firms (Forker, 1992; Cheng and Courtenay, 2006). Accordingly based on agency underpinning, it is formalised that

H3 Board independence positively moderates the relationship between firm profitability and risk disclosure.

2.2.3 Relationship between financial performance, gender diversity and risk disclosure

Gender diversity is a matter of discussion within the frame of reference of board composition. It involves presence of female directors in the boardrooms which is attributed to bringing in diversity in opinion and varied aspects to board's discussion (Barako and Brown, 2008). Agency theory propagates that gender diverse boards re-equips board independence and intensifies managerial monitoring (Cabedo and Tirado, 2004; Elzahar and Hussainey, 2012). Corroborating this theory, Ntim et al. (2013) unraveled positive relationship with divulgence of risk information. Contrastingly, ability of women is being questioned by authors like Bianco et al. (2013) who doubt their presence in bringing in extra value to board. Further, Cox and Blake (1991) argue that costs surges for firms integrating diverse workforce. Aligned with these studies, Allini et al. (2016) documented negative relationship. The reason for such indeterminate findings may be ascribed to the financial performance of firms with which they are associated. Hence, its indirect impact on the association between gender diversity and risk disclosure has been investigated in the current paper.

Firms with higher women directors on board signals lower risk levels and sound profitability position of firm; thereby leaving them with no incentive to have detailed disclosure of risk in annual reports to gain investors' attention (Arayssi et al., 2016). Besides, their presence in corporate board reduces the firm dependence on external entities due to wider pool of in-house talent (highly creative, sensitive and finer leadership skills of females on board) available to such financially affluent companies; ultimately enhancing the corporate legitimacy (Ashforth and Gibbs, 1990). Hence, profitable firms with larger proportion of women directors signal firms' quality to investors manifesting that since female directors effectively and timely supervise the managerial activities, these firms are not exposed to high risk; hence do not extensively disclose corporate risk information. Put differently from agency viewpoint, since gender diverse boards are effective monitors and help financially well-off companies in positively shaping up market perception towards them by the virtue of their behavioural traits; they need not indulge in higher disclosure of risk as compared to their homogenous counterparts (Hillman et al., 2002; Carter et al., 2003; Mahadeo et al., 2012; Bennouri et al., 2018). Additionally, since women directors keep a rigorous check on managerial malfeasance of corporate executives, profitable firms with gender diverse board need not incur additional proprietary cost for mitigating prevailing agency vices and enhancing the information symmetry in the organisation. Accordingly, such firms refrain from making higher risk disclosure (Ntim and Soobaroyen, 2013). Keeping in mind these considerations, the study hypothesises that

H4 Gender diversity negatively moderates the relationship between firm profitability and risk disclosure.

3 Research methods

3.1 Sample selection and data collection

The present study aims to analyse the relationship between firm performance and risk disclosure by moderating board structure in the Indian setting. For the purpose of the

study S&P BSE-100 index was chosen which captures the performance of 100 largest Indian companies which are traded on Asia's biggest and ancient stock exchange, i.e., Bombay stock exchange. The span of study revolves around contemporary period ranging from 2018–2019, as this time frame had linkage with certain anomalies in the Indian backdrop such as Punjab National bank scam; liquidity crunch in Infrastructure Leasing and Financial Services, a dominant NBFC of country. The study utilised annual reports of 70 non-financial companies leaving behind the financial firms due to their unique nature and governing regulations (Marzouk, 2016; Ntim et al., 2013). Annual report is picked as a medium for analysing risk disclosure due to its universal popularity as a medium of exchange for judging company's performance (Hassan, 2009).

3.2 Variable measurement

3.2.1 Dependent variable

The dependent variable in the study is risk disclosure which has been captured from the annual reports following prior researchers such as Beretta and Bozzolan (2004), Lajili and Zeghal (2005), Mohobbot (2005), Linsley and Shrives (2006), Abraham and Cox (2007), Konishi and Ali (2007) and Amran et al. (2008). Further, the study captures risk disclosure quantitatively using automated content analysis software Nvivo 11 and employing word count following Abraham and Cox (2007) and Li (2010) for adding precision and accuracy. The identification of risk in the annual report has it genesis in the definition as adopted by prior researchers in this domain (Abraham and Cox, 2007; Amran et al., 2008; Rajab and Handley, 2009; Ntim et al., 2013; Oliveira et al., 2011; Said and Mellet, 2013; Louhichi and Zreik, 2015; Haj-Salem et al., 2020; Gonidakis et al., 2020) embraced from Linsley and Shrives (2006)

> "Disclosures have been judged to be risk disclosure if the reader is informed about any opportunity, or prospect, or of any hazard, danger, harm, threat, or exposure, that has impacted upon the company or may impact upon the company in the future or the management of any such opportunity, prospect, hazard, harm, threat, exposure."

Prior literature (Abraham and Cox, 2007; Li, 2010; Elshandidy et al., 2013; Elshandidy and Neri, 2015; Allini et al., 2016) and Roget's thesaurus was used to identify 78 keywords of risk disclosure. Besides this, pilot testing of 30 annual reports was executed and all the words which had frequency less than five were dropped out for finalising the list of 39 risk keywords. The identified keywords are as follows: positive words are changes, differ, differences, diversified, fluctuations, growth, highest, increase, opportunity, over, sufficient, advantage, volatility, variation, expected, future, gain, high, significant, possible, likely and negative words as against, challenges, decline, decrease, exposure, less, loss, lower, offset, potential disadvantage, risk, reduce, uncertain, delay, low, reverse, failure with their suffix ly, es, s, ing. The reliability check of the measure has been conducted to robustness purpose.

3.2.2 Independent variable

The independent variable chosen in the study is financial performance of the firm which has been captured through return on assets (ROA) and equivalently return on equity (ROE) has been employed for robustness check in the study. Prior researchers utilise

accounting-based measure proclaiming that these have tendency of historical, backward, inward looking focus (Weisbach, 1988; Hermalin and Weisbach, 1991; Mehran, 1995; Khanna and Palepu, 2000) and supplementing its popularity.

3.2.3 Moderating variables

The moderating variables in the study comprises board size, referring to number of directors on board, board independence; proxied as the proportion of independent directors on board, gender diversity measured as the proportion of women directors on board. Consistent with the notion that effective board structure facilitates firm financial performance and firm risk disclosure; it has been diagnosed whether these board characteristics alters the relationship between firm profitability and risk disclosure through testing them as moderating variables.

3.2.4 Control variables

The study controls for several variables which have established link with risk disclosure in prior research. Firm size: large firms are affiliated with more visibility, greater resources, and economy in operations. Strand of prior risk disclosure studies documents a positive linkage between firm size and risk disclosure (Linsley and Shrives, 2005; Abraham and Cox, 2007; Ntim et al., 2013; Oliveira et al., 2011; Elshandidy et al., 2013; Elshandidy and Neri, 2015; Allini et al., 2016). In succession firm characterised by high leverage exhibits more riskiness and tend to divulge more risk information than their counterparts which has been witnessed in prior investigation (Hassan, 2009; Elshandidy et al., 2013). Further, Liquidity position of a firm also embarks significant impact on risk disclosure to signal superior performance through risk management (Elzahar and Hussainey, 2012). Lastly, Hassan (2009) demonstrates that companies with high risk level, increase risk disclosure to reduce uncertainties among investors and for better risk evaluation by the market.

The details of operationalisation of variables have been tabulated in Table 1.

Table 1 List of variables used in the study

Variables	*Description*
Total risk disclosure	Total risk word count encompassing positive and negative risk keywords.
	Independent variables
ROA	Return on assets measuring profitability of firm
Board size (moderator)	Total number of directors sitting on the board
Board independence (moderator)	Percentage of independent directors on board
Gender diversity (moderator)	Percentage of women directors on board
Board size * ROA	Interaction of board size with return on assets
Board independence * ROA	Interaction of board independence with return on assets
Gender diversity * ROA	Interaction of women directors with return on assets

Source: Compiled from various studies

Table 1 List of variables used in the study (continued)

	Control variables
Beta	Measures the level of firm riskiness.
Leverage	Debt level in firm capital structure measured by the ratio of total debt to total equity
Current ratio	Ratio of current assets and current liabilities
Firm size	Natural logarithm of market capitalisation

Source: Compiled from various studies

3.2.5 Model formulation

The moderating impact of board characteristics, i.e., board size, board independence and women directors has been tested using hierarchical moderated regression technique. The study also employs control variables like leverage, firm size, beta and current ratio that have evidenced established relationship in prior literature. Five models have been proposed for testing the formulated hypotheses.

In model 1, dependent variable, i.e., CRD (corporate risk disclosure) has been regressed on control variables and main independent variable, i.e., ROA.

$$\begin{aligned}&\text{Corporate risk disclosure}\left(\text{CRD}_i\right)\\&=\alpha+\beta_1\text{ROA}+\beta_2\text{Beta}+\beta_3\text{Leverage}+\beta_4\text{Current ratio}\\&+\beta_5\ln(\text{Market capitalisation})+\mu\end{aligned}$$

In model 2, direct impact of moderating variable, i.e., board size and its interaction term with ROA has been entered in analysis.

$$\begin{aligned}&\text{Corporate risk disclosure}\left(\text{CRD}_i\right)\\&=\alpha+\beta_1\text{ROA}+\beta_2\text{Board size}+\beta_3\text{Board size}*\text{ROA}+\beta_4\text{Beta}+\beta_5\text{Leverage}\\&+\beta_6\text{Current ratio}+\beta_7\ln\left(\text{Market capitalization}\right)+\mu\end{aligned}$$

Similarly, model 3 regresses on board independence and interaction term with ROA along with control and independent variables.

$$\begin{aligned}&\text{Corporate risk disclosure}\left(\text{CRD}_i\right)\\&=\alpha+\beta_1\text{ROA}+\beta_2\text{Board independence}+\beta_3\text{Board independence}\\&+\beta_4\text{Beta}+\beta_5\text{Leverage}+\beta_6\text{Current ratio}+\beta_7\ln\left(\text{Market capitalisation}\right)+\mu\end{aligned}$$

Model 4 incorporates board diversity and its interaction with ROA with simultaneous inclusion of independent and control variables.

$$\begin{aligned}&\text{Corporate risk disclosure}\left(\text{CRD}_i\right)\\&=\alpha+\beta_1\text{ROA}+\beta_2\text{Gender diversity}+\beta_3\text{Gender diversity}*\text{ROA}+\beta_4\text{Beta}\\&+\beta_5\text{Leverage}+\beta_6\text{Current ratio}+\beta_7\ln(\text{Market capitalization})+\mu\end{aligned}$$

Final model, i.e., model 5, extensively encompasses control variables, independent variable and all moderating variables along with their interaction terms respectively.

$$\text{Corporate risk disclosure}\left(\text{CRD}_i\right) = \alpha + \beta_1 \text{ROA} + \beta_2 \text{Board size} + \beta_3 \text{Board size} * \text{ROA} + \beta_4 \text{Board independence} + \beta_5 \text{Board independence} * \text{ROA} + \beta_6 \text{Gender diversity} + \beta_7 \text{Gender diversity} * \text{ROA} + \beta_8 \text{Beta} + \beta_9 \text{Leverage} + \beta_{10} \text{Current ratio} + \beta_{11} \ln\left(\text{Market capitalisation}\right) + \mu$$

where μ is error term.

4 Results and discussion

4.1 Descriptive statistics

Table 2 summarises descriptive statistics of the variables deployed in the study. The analysis of results decrypts that the sample companies divulge risk ranging from 288 words to 4,085 words with an average value standing at 2,012 words. High standard deviation value of 826 words points towards the sizable variation in the risk disclosure by companies. Considerable difference in the minimum (288 words) and maximum value (4,085 words) further highlights that though all the companies disclose the risk; they enjoy substantial latitude in the magnitude of disclosure. The statistical configuration pertaining to ROA exhibits that the firms have an average profitability of 11.9% with as high as 55.8% profitability earned by certain companies in the sample. Indian firms do not exhibit higher riskiness relative to market risk as evidenced through mean value of beta. Average value of board size, which stands at 13, suggests that BSE-100 companies have neither too small nor too larger boards. Further, the table unmasks that, at most 77.8% of directors are independent with average proportion standing at 52.9% indicating that top 100 non-financial companies are engaging majority of independent directors. This clearly implies the good governance practices followed by these Indian companies. As far as the proportion of women directors is concerned, meagre mean proportion of 13.8% indicates that companies are merely following the mandatory practice of appointing at least 1 woman director on board. Moreover, low maximum proportion of 28.6% of women directors spotlights the need to undertake various legislative efforts to break the glass-ceiling prevailing in Indian corporate sector, in particular.

Table 2 Summary statistics of variables employed in the study

Variables	*Unit of measurement*	*Mean*	*Median*	*Standard deviation*	*Minimum*	*Maximum*
Total risk	Number of words	2,012	1,979	826.00	288.00	4,085
Beta	Ratio	1.00	0.92	0.47	0.14	2.23
Leverage	Ratio	0.26	0.08	0.36	0.00	1.35
Current ratio	Ratio	1.83	1.61	1.07	0.22	5.58
Ln (firm size)	Rupees (crores)	11.00	10.80	0.89	9.46	13.70
ROA	Percentage	11.90	10.40	9.18	–2.06	55.80
Board size	Count	13.10	12.00	3.42	7.00	23.00
Board independence	Percentage	52.90	52.80	11.20	12.50	77.80
Gender diversity	Percentage	13.80	13.30	6.00	5.00	28.60

Source: Field data

Table 3 Correlation matrix for variables

Variables		*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1	Total risk disclosure	1											
2	Beta	0.067	1										
3	Leverage	0.400***	0.258**	1									
4	Current ratio	–0.271**	–0.523***	–0.513***	1								
5	Ln (firm size)	0.230*	–0.230*	–0.066	–0.047	1							
6	ROA	–0.472***	–0.299**	–0.433***	0.353***	0.295**	1						
7	Board size	0.094	0.141	0.115	–0.231*	0.162	–0.078	1					
8	Board independence	0.063	–0.183	–0.133	0.219*	0.103	0.094	–0.353***	1				
9	Gender diversity	0.211*	–0.094	0.065	0.173	–0.098	–0.143	–0.442***	0.264**	1			
10	Board size * ROA	0.061	–0.013	–0.096	0.079	–0.021	0.322***	–0.081	0.089	–0.018	1		
11	Board independence * ROA	–0.304**	–0.074	–0.265**	0.149	0.245**	0.252**	0.114	–0.188	–0.130	–0.295**	1	
12	Gender diversity * ROA	–0.245**	–0.149	–0.014	0.089	0.128	–0.200*	–0.025	–0.144	0.001	–0.283**	0.341***	1

Notes: The table reports Pearson correlation coefficient examined between variables.
***, ** and * indicate statistical significance at 1%, 5% and 10% level, respectively.

Source: Field data

4.2 Correlation matrix

From Table 3, it is clearly evident that the multicollinearity is not a problem for the data because the highest correlation coefficient of 0.44 which is below threshold limit of 0.80 (Gujarati, 2003). Following Aiken et al. (1991), the independent variable, i.e., ROA and moderator variables, i.e., board size, board independence and gender diversity has been centred before computing their interaction term; hence, the multicollinearity is not a grave concern in the sample. Value of Variance Inflation Factors as shown in table 4 reaffirms this fact.

4.3 Regression analysis

The testing of above formulated hypotheses in the present study has been performed using moderated hierarchical regression. Since, the objective of the paper has been to examine the moderating role of board structure (measured in terms of board size, board independence and gender diversity) on the relationship between firm profitability and risk disclosure; moderated hierarchical regression technique is the suitable statistical technique as it appropriately tests the hypotheses comprising interaction terms (Hartmann and Moers, 1999). Under this technique, the presence of moderation effect, i.e., direction and magnitude is gauged through the estimate of regression coefficient. If it emerges out to be significant, then it is considered that the variable moderates the relationship between independent variable and dependent variable (Fairchild and MacKinnon, 2009). Another issue concerning the moderated hierarchical regression analysis is the mean-centring of continuous variables before interacting them. The purpose of centring the variable is to minimise the probability of multicollinearity between variables concerned (Frazier et al., 2004; De Clercq et al., 2010). Since, board structure variables, i.e., board size, board independence, gender diversity and independent variable, i.e., ROA, ROE are continuous variables, they have been mean-centred before interacting them. Afterwards, when the models presented in the study have been subject to collinearity diagnostics; acceptable limits of VIFs (<10) rules out the problem of multicollinearity. Likewise, residuals emerged out to be normally distributed (chi square = 5.232, $p = 0.0731$, $p > 0.05$). However, the problem of heteroscedasticity was diagnosed and as a solution, White heteroscedasticity consistent standard errors have been used to contain it.

The application of moderated hierarchical regression entails the segregation of Table 4 into five different models with model 1 comprising of independent variable, i.e., ROA along with control variables in the study. The moderators and their interaction terms have been sequentially inserted in models 2, 3 and 4 respectively. Final model, i.e., Model 5 comprehensively encompasses all the variables employed in the study.

First model assimilates independent variable along with control variable; explaining 36.39% variation in risk disclosure. With respect to primary variable, i.e., ROA; Vandemaele et al. (2009) and Allini et al. (2016) documented negative relationship between firm's profitability and risk disclosure. Skinner (1994) argues that bad performance increases manager's incentives to disclose risk information and firm's future prospects for avoiding adverse effect on future litigation risks. Supporting proprietary cost theory, the negative relationship is attributed to the most discussed competitive cost which profitable companies have to incur for divulging risk information (Oliveira et al., 2011). Among control variables, leverage emerges out to be positively associated with

corporate risk disclosure across all models in Table 4. The findings are akin to prior studies showing a positive association between leverage position of firm and risk disclosure (Hassan, 2009; Oliveira et al., 2011; Elshandidy et al., 2013) on account of sufficing the informational needs of large lenders. Along the similar lines, the positive finding of firm size as measured by market capitalisation is akin to prior risk disclosure studies (Linsley and Shrives, 2005; Abraham and Cox, 2007; Ntim et al., 2013; Oliveira et al., 2011; Elshandidy et al., 2013; Elshandidy and Neri, 2015; Allini et al., 2016).

Table 4 Hierarchical moderated linear regression results

Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Variance inflation factors*
Constant	–1,845.43* (–1.774)	–2,009.61* (–1.810)	–2,493.95** (–2.148)	–2,822.40*** (–2.662)	–2,826.68** (–2.117)	
Beta	61.459 (0.268)	34.710 (0.161)	101.572 (0.446)	–9.826 (–0.052)	–41.082 (–0.216)	1.593
Leverage	534.865** (2.134)	503.691** (2.151)	540.723** (2.381)	431.983** (2.112)	404.718** (2.011)	1.550
Current ratio	48.102 (0.678)	49.153 (0.669)	62.731 (0.871)	53.784 (0.842)	49.138 (0.684)	2.070
Ln(firm size)	374.255*** (4.461)	409.658*** (4.797)	406.779*** (4.226)	451.190*** (5.217)	458.316*** (5.744)	1.411
ROA	–45.171** (–2.423)	–55.525*** (–5.126)	–42.420** (–2.355)	–55.283*** (–3.460)	–63.062*** (–5.387)	2.064
Board size		3.806 (0.130)			7.017 (0.199)	1.482
Board size * ROA		7.549** (2.390)			6.140* (1.876)	1.368
Board independence			–3.922 (–0.614)		–0.734 (–0.124)	1.332
Board independence * ROA			1.839** (2.012)		0.498 (0.497)	1.602
Gender diversity				20.077* (1.871)	22.034* (1.869)	1.385
Gender diversity * ROA				–7.993*** (–4.300)	–7.395*** (–3.553)	1.425
Adjusted R square	0.3639	0.4228	0.3823	0.5071	0.5216	
F-statistics	7.585***	9.462***	8.994***	10.731***	14.025***	

Notes: T-tests are in parentheses.
***, ** and * indicate statistical significance at 1%, 5% and 10% level respectively.

Source: Field data.

In the second model, first moderating variable, i.e., board size and its interaction with ROA has been included. The regression model emerge out to be statistically fit with Adjusted R square of 42.28% suggesting the significant change of 5.89% from model 1. The significant change and significance of interaction term of board size with ROA in models 2 and 5 leads us to conclude that board size positively moderates the relationship

between ROA and risk disclosure. The positive relationship suggests that profitable firms with larger board size are induced to reveal higher risk related information in annual report for effective monitoring and ensuring the transparency to investors. Further, since firms which are financially sound are more susceptible to managerial moral hazards; their board impels them to extensively engage in corporate risk disclosure. Contrary, the direct association between board size and risk disclosure emerges out to be non-significant.

With regards to second moderating variable, i.e., board independence and its interaction term, model 3 is analysed that explains 38.23% variation in risk disclosure. From the results, it can be clearly observed that addition of interaction of board independence with ROA improved the explanatory power of model by 1.84% change in adjusted R square from model 1. Further, the coefficient of interaction term, i.e., board independence with ROA is significantly positive. The positive coefficient implies that although less knowledgeable about firm internal operations; independent directors expedites risk disclosure so that their reputation is not blemished and investors' do not sue them for hiding material information pertaining to risk disclosure (Forker, 1992; Cheng and Courtenay, 2006). Further, higher disclosure keeps executives of the firm under strict monitoring and public surveillance, thereby, preventing them from exploiting firms' profitability position to their own advantage (Eng and Mak, 2003). Hence, outside directors in financially sound firms compels higher risk disclosure. However, the variable fails to moderate the relationship in final model. In addition, board independence fails to have any direct relationship with risk disclosure in models 3 and 5 (Elshandidy and Neri, 2015; Allini et al., 2016; Madrigal et al., 2015; Saggar and Singh, 2017).

In consideration to fourth model, that comprises third moderating variable, i.e., women directors and its interaction with ROA, adjusted R square explains 50.71% variation in dependent variable, i.e., risk disclosure. Huge significant changes in Adjusted R square of 14.32% manifest that women directors and its moderating role has a significant impact on risk disclosure. With respect to direct association between gender diversity and risk disclosure, the relationship is unravelled to be positive and significant in models 4 and 5 respectively suggesting that gender diverge boards intensifies the board monitoring and amplifies the corporate legitimacy (Cabedo and Tirado, 2004; Elzahar and Hussainey, 2012). The coefficient of interaction term of women directors, however, popped out to be negatively significant in models 4 and 5 suggesting that women directors negatively impact the relationship between firm profitability and risk disclosure. This negative association would mean that since women directors aims to intensify the reputation of firm through their huge gamut of cognitive skills, creative skills and unique leadership qualities; they engage in extensive disclosure of risk related information for less profitable firms to gain investors confidence and corporate legitimacy. Besides, to avoid any sort of legal penalty, ensure the effective monitoring of financially unsound companies and help them in gaining investors' confidence, risk disclosure of such companies is increased resulting in higher information transparency and reduced uncertainty. In other words, poor performance incentivises the women directors to precisely disclose risk information for aversing any sort of litigation risks (Carter et al., 2003; Mahadeo et al., 2012; Arayssi et al., 2016). Thus, the significant findings of women directors and its interaction term indicate that women directors accentuate risk disclosure for less profitable firms emphasising its importance as a moderating variable.

In Model 5, comprehensively analysing the relationship between independent variable, moderating variables and their interaction effects explain 52.16% variation in risk disclosure. The statistically significant F-value points towards the overall fitness of

model. The model explicitly confirms the moderating effect of board size and gender diversity on the relationship between firm profitability and risk disclosure.

Table 5 Robustness Test

Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Variance inflation factors*
Constant	–1,360.50 (–1.274)	–1,180.15 (–1.025)	–2,067.81 (–1.824)	–1,402.19 (–1.268)	–2,009.55 (–1.447)	
Beta	69.968 (0.316)	50.407 (0.231)	137.872 (0.645)	–15.472 (–0.075)	28.713 (0.143)	1.658
Leverage	667.123*** (3.006)	653.010*** (2.927)	549.000*** (2.844)	541.846*** (2.739)	454.061** (2.331)	1.543
Current ratio	–16.429 (–0.230)	–46.343 (–0.625)	–16.304 (–0.249)	–98.448 (–1.415)	–95.152 (–1.292)	2.046
Ln(firm size)	333.647*** (3.991)	337.697*** (3.893)	374.203*** (4.082)	317.623*** (3.652)	340.253*** (3.832)	1.343
ROE	–25.233*** (–3.502)	–25.099*** (–3.754)	–23.339*** (–3.387)	–23.672*** (–3.944)	–21.932*** (–4.039)	1.178
Board size		10.437 (0.340)			17.462 (0.498)	1.475
Board size * ROE		2.776 (1.309)			1.669 (0.819)	1.214
Board independence			–3.603 (–0.641)		–0.743 (–0.101)	1.276
Board independence * ROE			1.663*** (2.774)		1.087 (1.476)	1.407
Gender diversity				31.297** (2.334)	34.473** (2.407)	1.386
Gender diversity * ROE				–2.149*** (–3.185)	–1.567** (–2.079)	1.206
Adjusted R square	0.3870	0.3977	0.4210	0.4669	0.4692	
F-statistics	9.415***	8.337***	10.658***	11.676***	13.004***	

Note: T-tests are in parentheses. ***, ** and * indicate statistical significance at 1%, 5% and 10% level respectively.

Source: Field data

4.3.1 Robustness test

In this test, the current research paper employ sensitivity test to diagnose the robustness of our results. For this, the study employs alternative measure of financial performance, i.e., return on equity (ROE) as shown in Table 5. The application of similar technique, i.e., moderated hierarchical regression technique reveals almost similar results consistent with the findings obtained using ROA as a performance measure. The findings unveil that while board independence positively moderates the relationship between financial performance and corporate risk disclosure; gender diversity negatively moderates the relationship between analysed variables. Contrariwise, board size cast no moderating

impact suggesting that board size has no intervening role in explaining the dynamics between firm profitability and risk disclosure. Alike with the findings in table 4, return on equity also negatively impacts the risk disclosure. Similarly, women directors also have significant positive direct impact on corporate risk information. Thus, congruity in the findings of board independence and gender diversity as shown in Table 5 reinforces our prior results (Table 4) and confirms that they are sturdy and insensitive to the alternative measure of financial performance.

5 Conclusions

The study invokes agency theory and proprietary cost theory as contextualised settings to frame the moderating impact of board characteristics on the relationship between financial performance and corporate risk disclosure. Framing a sample of 70 BSE listed non-financial firms extracted from BSE 100 index; the present research is a promising attempt to broaden the horizons of risk disclosure literature by exploring the not so explored role of board characteristics as intervening factor in the relationship between firm profitability and risk disclosure. With regards to descriptive statistics, findings vividly highlight considerable variation in risk disclosure by various companies ranging from 288 words to 4,085 words. On an average, firm discloses 2,012 words. Additionally, Indian firms are evinced to be profitable with mean return of 11.9 and maximum return of 55.80%. Upon deeper investigation, the regression results unveil that firms that are profitable indulge in less disclosure of risk. It further reveals that while board size, board independence positively moderates the relationship between firm profitability and corporate risk disclosure; gender diversity negatively moderates the relationship between firm profitability and risk disclosure. Positive moderation, on one hand, suggest that despite the competitive cost incurred in divulging the risk related information; larger and highly independent board compels higher risk disclosure for profitable firms for ensuring higher transparency to investors. Negative moderating impact of women directors; on the other hand, propose that since investors positively perceive the firms embracing gender equity in corporate boards; they ensure extensive disclosure of risk particularly for low profitable firms to assist them gain corporate legitimacy. Additionally, since women directors affiliate themselves with low-risk firms; risk disclosure is automatically low for such firms.

The study provides implication for managers towards designing board structure in such a way that it comprises larger number of directors with optimum combination of independent directors. Along the similar lines, it directs managers in breaking the stereotypic attitude towards women by hiring higher number of women directors as they help financially weak companies gain higher investors' confidence and reputation. Thus, the study recommends upper echelon executives to appoint optimum proportion of independent directors and women directors to ensure adequate risk disclosure. For rigorous implementation the regulators are advised to implement legislative efforts in fixing a proportion of women directors on board as against contemporary regulation of mandatory appointment of one female director in the Indian context.

The present study scrutinises the relationship between firm performance and risk disclosure by moderating the board structure in the Indian setting in the period prior to the outbreak of colossal COVID-19 so future studies are guided to study risk disclosure by corporations in light of the pandemic. A cross country analysis is suggested to check

robustness of the findings of current study. Further, the span of the present study was cross sectional whereas future research should undertake longitudinal analysis for checking the relationship between firm performance and risk disclosure and moderating role of board structure for generalisable results.

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